

**PERFORMANCE WORK STATEMENT
STREAMS II
TASK ORDER 0004, TETRA TECH EP-C-11-037**

A. TITLE: Framework and Inventory of Relative Wetland Vulnerabilities to Inform EPA Office of Water Programs

B. TASK ORDER MANAGER (TOM):

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C. PERIOD OF PERFORMANCE: October 15, 2012 though October 15, 2013

D. EPA GLOBAL CHANGE IMPACTS AND ADAPTATION PROGRAM

The EPA Office of Research and Development's Global Change Impacts and Adaptation (GCIA) staff within the Air, Climate and Energy (ACE) National Program assesses the potential vulnerability¹ to climate change (and other global change stressors such as land-use change) of EPA's ecosystem, water, human health and air protection efforts at the federal, regional, state, municipal, and tribal levels, as well as adaptation options to build resilience in the face of these vulnerabilities. We carry out interdisciplinary syntheses across newly emerging scientific findings to identify potential impacts and characterize and communicate the uncertainty in the science to provide adaptation² support for decision makers and managers. Vulnerability and adaptation assessment activities in the GCIA aquatic ecosystems focus area support EPA's mission and responsibilities as defined by the Clean Water Act (CWA), and are designed to build the capacity of EPA program and regional offices, water and wetland managers, and other decision-makers to assess and respond to global change impacts on aquatic ecosystem processes and services.

¹ Vulnerability is defined as the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. It is a function of the sensitivity of a particular system to climate changes, its exposure to those changes, and its capacity to adapt to those changes.

² Adaptation refers to adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities.

E. BACKGROUND

During the last century, much of the U.S. experienced gradually warming temperatures, increases in precipitation and intensity of precipitation events, and sea level rise (IPCC 2007; CCSP 2008; CCSP 2009). Wetlands are highly vulnerable to such changes. Impacts such as increased inundation of coastal wetlands, changes in water availability and quality, and altered patterns of sedimentation and erosion are increasingly interacting with other human stressors such as nutrient loading and land use changes. Resulting issues of concern highlighted in the Office of Water's (OW) National Water Program Strategy for Climate Change (<http://water.epa.gov/scitech/climatechange/2012-National-Water-Program-Strategy.cfm>) include:

- Increases in water pollution problems due to warmer air and water temperatures, causing an increase in the number of waters recognized as "impaired;"
- More extreme water-related events, including heavier precipitation during tropical and inland storms, with adverse effects on water quality and aquatic system health;
- Waterbody boundary movement and displacement as rising sea levels alter ocean and estuarine shorelines and as changes in water flow and precipitation affect the size of wetlands and lakes;
- Changing aquatic biology due to warmer water and changing flows, resulting in significant deterioration of aquatic ecosystem health in some areas; and
- Collective impacts on coastal areas resulting from a combination of sea level rise, increased damage from floods and storms, changes in drinking water supplies, and increasing temperature and acidification of the oceans.

As a result of the above impacts, the practices and success of a number of OW programs may be affected, including: the CWA Section 404 compensatory mitigation program (<http://www.epa.gov/owow/keep/wetlands/wetlandsmitigation/index.html>); the Healthy Watersheds Initiative (HWI) (http://water.epa.gov/polwaste/nps/watershed/hwi_action.cfm); and the National Wetland Condition Assessment (NWCA) (<http://water.epa.gov/type/wetlands/assessment/survey/index.cfm>). With regard to the CWA Section 404 program, OW's climate strategy goal is to ensure that "EPA incorporates climate change considerations into the wetlands program". For the HWI, the goal is to "Identify, protect, and maintain a network of healthy watersheds and supportive habitat corridor networks across the country that provides resilience to climate change". For the NWCA, there is a similar goal to "Incorporate climate resilience into watershed protection, restoration and floodplain management."

F. PURPOSE OF THIS TASK ORDER

The purpose of this Task Order (TO) is to develop a framework and inventory of relative wetland vulnerabilities at multiple scales based on integration of information on vulnerability assessment methods and wetlands classification systems. The analysis will make use of relevant information from OW's CWA 404, HWI, and NWCA program efforts, and the results will be framed to inform on best approaches for development of further guidance for integrating climate change considerations into each of these program's practices.

G. REQUIRED CONTRACTOR QUALIFICATIONS

- 1) Multidisciplinary professional expertise in assessing the impacts of climate change and other interacting stressors (such as land use change) on wetlands, including expertise in resilience and threshold theory and management adaptation.
- 2) Thorough knowledge and application of wetlands classification systems including the hydrogeomorphic method (HGM) and Cowardin/National Wetlands Inventory (NWI) system; thorough knowledge of the CWA Section 404 compensatory mitigation program; and familiarity with the National Wetland Condition Assessment and the Healthy Watersheds Initiative, in particular the integrated assessment methods described in the document "Identifying and Protecting Healthy Watersheds: Concepts, Assessments, and Management Approaches" (Technical Document)³.
- 3) Expertise in directed literature searches.
- 4) Experience organizing and facilitating expert scientific workshops.
- 5) Experience developing, managing, and ensuring quality control of large-scale datasets and assessments.
- 6) Experience preparing technical reports and papers written in clear, concise prose consistent with the standards of peer reviewed scientific literature.

H. TECHNICAL PROPOSAL AND QUALITY ASSURANCE PLAN (QAPP)

Contractor proposals should describe the Contractor's qualifications and proposed approach together with the schedule, staffing, and hours required for completion of each task described in this Task Order. All work conducted under this Task Order shall be performed pursuant to an approved Quality Assurance Project Plan (QAPP).

I. TASKS AND DELIVERABLES

TASK 1: Establish Communication and Develop a QAPP

SubTask 1.1. Establish communication with the TOM and develop a regular reporting schedule

The Contractor shall contact the TOM and schedule a kickoff meeting for the project. In collaboration with the TOM the Contractor shall also establish a schedule for regular progress reports (e.g. one phone call per month for one hour), project meetings, and other communications throughout the period of performance of this Task Order.

Deliverable 1.1.A: Schedule a kickoff meeting with the TOM. Due 1 week after being issued the Task Order.

Deliverable 1.1.B: Brief, written progress reports as emails to the TOM. Due monthly or upon request by the TOM for the duration of this Task Order.

³ This document may be found at http://water.epa.gov/polwaste/nps/watershed/hw_techdocument.cfm

Deliverable 1.1.C: Project meetings and other communications, such as conference calls, as needed. Due upon request by the TOM for the duration of this Task Order.

SubTask 1.2. Develop a QAPP

All work conducted under this Task Order shall be performed pursuant to an EPA approved Quality Assurance Project Plan (QAPP). The contractor shall develop a Quality Assurance Project Plan within 30 days after project start for review and approval by the TOM and the EPA QA Officer. The QAPP shall outline the approach and measures the Contractor will implement to ensure a high standard of quality in data and information analysis and written deliverables. The QAPP shall be in conformance with EPA's *Requirements for Quality Assurance Project Plans* (EPA QA/R-5), available at <http://www.epa.gov/quality/qs-docs/r5-final.pdf>. The QAPP shall also document the literature search strategy and address the use of existing (second and third party) data to carry out this Task Order (see Appendix A to this Task Order) "NCEA Guidance on Quality Assurance Project Plans for Secondary Research Data." The Contractor shall prepare a draft QAPP and submit to the TOM/QA Manager for review. The TOM and QA Manager will review and provide comments on the Contractor's draft QAPP. The Contractor shall revise the draft to address EPA comments and submit a final QAPP to the TOM/QA Manager for approval.

All electronic deliverables (i.e., computer files) shall be submitted in a format acceptable to EPA.

The contractor shall not incur billable costs for QA related work until receiving IN WRITING from the EPA TOM that EPA has approved the QAPP.

Deliverable 1.2.A: A draft QAPP submitted to the TOM for review. Due 3 weeks after being issued the Task Order.

Deliverable 1.2.B: A revised QAPP addressing TOM and QA officer's comments on the QAPP. Due 1 week after receiving comments.

TASK 2: Technical Steering Committee Support

The Contractor shall provide logistical support for assembling a Technical Steering Committee (TSC) for the project, consisting of 5-10 experts from EPA and other government agencies. The TSC shall be briefed regularly and will provide feedback on project design and results through one kickoff webinar of 1.5 hours and 6-7 webinars of 1 hour each, to be scheduled at regular intervals as determined in consultation with the TOM. Tentative points for TSC briefing webinars during the project are indicated in Tasks 3-7 below. (The TSC will also be requested to attend the workshop outlined in Task 5 below.)

SubTask 2.1. Establish a Technical Steering Committee and schedule a 1.5 hour kickoff call

Deliverable 2.1.A: Assist the TOM in assembling the TSC by preparing a brief description of TSC duties based on information provided by the TOM, drafting a tentative call schedule, transmitting information to potential TSC members, and securing confirmation of member commitments to participate. Due 4 weeks after completion of Deliverable 1.1.A.

Deliverable 2.1.B: Schedule and host a 1.5 hour kickoff webinar for the TSC, including preparation of a presentation on project background, project plan, purpose of the TSC, type and frequency of TSC feedback on project, etc. Due 2 weeks after approval of Deliverable 2.1.A.

SubTask 2.2. Organize periodic briefing webinars

Deliverable 2.2.A: In consultation with the TOM, schedule, host, and take notes for 3-4 webinar briefings of 1 hour each for the TSC, placed at intervals throughout the project. Tentative points for TSC webinars during the project are indicated in Tasks 3-7 below.

Deliverable 2.2.B: In consultation with the TOM, develop presentations and other materials as needed for each webinar.

Task 3: Project Feasibility Assessment

In consultation with the TOM, the Contractor shall analyze the feasibility of designing a unified conceptual framework for evaluating the relative vulnerability of wetland types by classification system, eco-regions, climate regions, or other appropriate organizational structure, including appropriate scales at which to compile a national inventory of wetland vulnerabilities. Through literature review, the Contractor shall consider information – as both context and content for the framework – from OW’s CWA Section 404, HWI, and NWCA programs; wetlands classification systems including the Cowardin/NWI and HGM systems; relevant publications of the Association of State Wetland Managers (<http://aswm.org/>); and the scientific literature on vulnerability assessment methods applied to wetlands. The framework should cover as many classification systems to inform as many programs as practicable; i.e., the goal is to develop a single framework that integrates attributes from across the classification systems and programs, such that it can be populated by data from and inform any of the programs. The ultimate purpose of the information will be to support identification of top characteristics of wetlands vulnerability of concern for management adaptation.

SubTask 3.1. Assess the feasibility of developing a vulnerability framework using Cowardin/NWI and HGM classification systems. This should involve consideration of questions such as:

- Are these classification systems sufficient – either separately or in combination – to be used to develop a framework for assessing relative vulnerabilities of wetlands? At what scale?
- How can the framework address sensitivity and exposure as a pathway to understanding vulnerability?
- At what scales can such a framework be built/used meaningfully?
- How would information from the framework link meaningfully to the needs of OW’s CWA Section 404 and HWI programs in terms of informing adaptation?
- What data are available from the CWA Section 404, HWI and NWCA programs (e.g., coverage, periodicity, etc.) for populating the framework?

Deliverable 3.1.A: Bibliography representing a literature review in support of identifying potential wetlands attributes for use in the framework -- based on their climate change sensitivities and relationship to resilience – drawn from HGM and Cowardin/NWI classification systems and the approaches/attributes used by the CWA Section 404, HWI, and NWCA programs. Due 8 weeks after completion of Deliverable 1.1.A.

Deliverable 3.1.B: Memo describing feasibility analysis of options for developing a framework to assess wetlands vulnerabilities. Options include a (preferably) single unified framework and/or separate frameworks for the different classification systems or wetland types. Due 4 weeks after approval of Deliverable 3.1.A.

SubTask 3.2. Propose scoping criteria and approach for developing a framework

Working with the full suite of options developed in SubTask 3.1, the Contractor shall propose criteria for evaluating the options for their overall importance/effectiveness in supporting programmatic goals and advancing scientific knowledge, as well as their tractability in terms of availability of information and/or data. Based on the proposed criteria and feedback from the TSC, the TOM shall narrow the scope of the project in terms of what wetland(s) and program(s) on which to focus for a first round draft framework. The Contractor shall then develop a plan with steps for drafting the conceptual framework.

Deliverable 3.2.A: Memo proposing criteria for selecting an approach to a framework based on the options of 3.1.B, which may include narrowing by classification system type, wetland type and/or OW program(s) on which to focus development of the draft framework. Due 2 weeks after approval of Deliverable 3.1.B.

Deliverable 3.2.B: Webinar with the TSC to obtain feedback on criteria and guidance on their application in narrowing the scope, followed by memo revising Deliverable 3.2.A, documenting the TOM's selection of an approach, and developing a plan with steps for drafting the conceptual framework. Due 4 weeks after approval of Deliverable 3.2.A.

NOTE: Based on future availability of funds, additional options may later be selected from the full suite of options in SubTask 3.1, for subsequent development of additional frameworks. This would involve replicating (reiterating) some or all of Tasks 4-8 below and SubTask 2.2 above (TSC briefings), to generate up to two (2) more options (frameworks) focusing on different/additional crosscuts of attributes, classification systems, wetland types, and/or scales.

Task 4: Draft Conceptual Framework and Inventory of Relative Wetland Vulnerabilities

Starting with the information and approach developed in Task 3, the Contractor shall create a framework and inventory of relative vulnerabilities that is structured to support prioritization of most sensitive and vulnerable wetland types. The framework should support consideration of sensitivity of the system and its exposure to climatic changes, as determinants of vulnerability.

SubTask 4.1. Develop a draft conceptual framework for considering relative vulnerabilities of wetlands

Deliverable 4.1.A: Draft framework with examples of inventory entries for relative wetland vulnerabilities. Due 4 weeks after approval of Deliverable 3.2.B.

Deliverable 4.1.B: Webinar with the TSC to obtain feedback, and revised draft framework and examples of inventory entries for relative wetland vulnerabilities. Due 4 weeks after approval of Deliverable 4.1.A.

SubTask 4.2. Develop an inventory of relative vulnerabilities of wetlands

In consultation with the TOM and using the draft framework, the Contractor shall compile a national inventory of wetland relative vulnerabilities, structured to distinguish most sensitive and vulnerable wetland types and/or locations, at scales appropriate to identifying key characteristics of vulnerability most relevant to the selected OW program(s) of focus.

Deliverable 4.2.A: Draft inventory of relative vulnerabilities of wetlands at multiple scales. Due 8 weeks after approval of Deliverable 4.1.B.

Deliverable 4.2.B: Revised draft inventory of relative vulnerabilities of wetlands at multiple scales. Due 3 weeks after approval of Deliverable 4.2.A.

Deliverable 4.2.C: A draft Memo explaining the framework and summarizing the inventory findings, to be used as a background white paper for the workshop in Task 5 below. Due 2 weeks after approval of Deliverable 4.2.B.

Deliverable 4.2.D: Final Memo explaining the framework and summarizing the inventory findings, to be used as a background white paper for the workshop in Task 5 below. Due 2 weeks after receiving comments from the TOM on Deliverable 4.2.C.

TASK 5: Expert Workshop to Present Framework and Inventory and Solicit Feedback

In consultation with the TOM, the Contractor shall assist in organizing and hosting a 1.5 day expert workshop in which the draft framework will be presented and evaluated. The workshop will be held at the EPA facilities in Arlington, Virginia (Potomac Yards), in conference rooms (including audiovisual equipment) to be reserved by the TOM at no cost to this project. Approximately 30 local experts from EPA and other Federal agencies will be invited to the workshop to comment on the draft framework and inventory and discuss implications of the results for their research and programmatic work.

SubTask 5.1. Organize the workshop

The TOM shall provide the Contractor with a participant list. The Contractor shall: send invitations to participants and confirm their attendance; develop a workshop agenda and presentation; and send the white paper (Deliverable 4.2.D) to the workshop participants in advance of the workshop. All materials will be electronic. All of the participants will be local Federal employees and thus not subject to travel reimbursement, with the exception of one participant to be invited from the Association of State Wetlands Managers with experience in areas such as: climate change impacts and adaptation for wetlands; development of state wetland regulatory and management programs; training and capacity building for state wetlands programs; facilitating the integration of wetlands into water resources and watershed management; conservation and restoration partnerships among states, tribes, local governments, nonprofits, and other interested parties; integration of wetlands into broader landscape and resource management initiatives. Due 8 weeks after approval of Deliverable 4.2.D.

SubTask 5.2. Provide onsite workshop support and meeting notes

At the workshop, Contractor staff shall: register invited participants and observers; assist with facilitation as needed; and take notes during workshop discussions. Due 2 weeks after approval of Deliverable 5.1.

TASK 6: Revised Framework and Inventory Based on Workshop Feedback

After the workshop of Task 5, the Contractor shall use feedback obtained during and after the workshop from participants and attending TSC members to revise and improve the conceptual framework and inventory.

Subtask 6.1. Complete a post-workshop revision of the conceptual framework and inventory

Based on comments, feedback, references and other materials obtained at the workshop, the Contractor shall revise, enhance and supplement the workshop draft conceptual framework and inventory (Deliverable 4.2.B) and submit a revised version. Due 4 weeks after completion of Deliverable 5.2.

Subtask 6.2. Submit a final revised framework and inventory

The Contractor shall convene a webinar of the TSC to solicit feedback on the revised framework, followed by submission of a final revised framework based on TSC and TOM comments. Due 6 weeks after receiving TSC and TOM comments on Deliverable 6.1.

Task 7: Analysis and Summary of Best Approaches for Applying Inventory Results to Future Development of Guidance for OW's 404, HWI, and NWCA Wetlands Programs

Based on the information developed in Tasks 3-6 above, the Contractor shall produce an analysis and summary of best approaches for climate change adaptation guidance for OW's 404, HWI, and NWCA programs. The analysis should examine topics such as:

- A path forward for future projects to integrate climate change vulnerability information into OW 404, HWI and NWCA programs
- Summary of additional information and research that would be needed to fulfill on the above
- Proposed steps for developing guidance for each program
- Examples of the types of programmatic adaptation options that might be considered based on the vulnerabilities revealed in the inventory, including:
 - Policy changes
 - Adjustments to wetlands management practices

Subtask 7.1. Prepare a detailed annotated outline for an analysis and summary of best approaches for development of guidance for OW programs based on the results of the framework and inventory

Deliverable 7.1.A: A proposed outline for an analysis and summary of best approaches for development of guidance for OW programs. Due 2 weeks after approval of Deliverable 6.2.

Deliverable 7.2.B: Annotated outline for an analysis and summary of best approaches for development of guidance for OW programs. Due 3 weeks after approval of Deliverable 7.1.A.

Subtask 7.2. Submit an analysis and summary of best approaches for development of guidance for OW programs

Deliverable 7.2.A: Full draft analysis and summary of best approaches for development of guidance for OW programs. Due 10 weeks after approval of Deliverable 7.1.B.

Deliverable 7.2.B: TSC webinar to obtain feedback, followed by submission of final analysis and summary of best approaches for development of guidance for OW programs. Due 8 weeks after receiving comments on Deliverable 7.2.A.

Task 8: Journal Article for Publication

The Contractor shall prepare a written manuscript in a concise format to be submitted for publication in a peer-reviewed scientific journal. The manuscript shall be written in the format of a peer-reviewed scientific journal such as Science or Nature (to be specified by the TOM), in clear, concise prose consistent with the standards of peer-reviewed scientific literature.

SubTask 8.1. Prepare a detailed annotated outline for a manuscript summarizing the conceptual framework, inventory, findings, preliminary implications for OW 404, HWI and NWCA programs, and/or other material/results as requested by the TOM.

Deliverable 8.1.A: A proposed outline for a manuscript summarizing the conceptual framework, inventory, findings and preliminary implications for OW 404, HWI and NWCA programs, and/or other materials requested by the TOM. Due 2 weeks after the approval of Deliverable 7.2.B.

Deliverable 8.1.B: Annotated outline for a manuscript summarizing the conceptual framework, inventory, findings and preliminary implications for OW 404, HWI and NWCA programs, and/or other materials requested by the TOM. Due 2 weeks after receiving comments from TOM on Deliverable 8.1.A.

SubTask 8.2. Prepare a full draft manuscript in a concise format to be submitted for publication in a peer-reviewed scientific journal summarizing the conceptual framework, inventory, findings and preliminary implications for OW 404, HWI and NWCA programs.

Deliverable 8.2.A: A first draft full manuscript summarizing the conceptual framework, inventory, findings and preliminary implications for OW 404, HWI and NWCA programs, and/or other materials requested by the TOM Due 12 weeks after approval of Deliverable 8.1.B.

Deliverable 8.2.B: A final draft manuscript addressing comments conveyed by the TOM. The revised manuscript shall be written in a format specified by the TOM, and be written in clear, concise prose consistent with the standards of peer reviewed scientific literature. Due 4 weeks after receiving TOM's comments on Deliverable 8.2.A.

J. Summary of Tasks, Deliverables, and Due Dates

SubTask No.	DELIVERABLE	Incremental Schedule	Gross Schedule Weeks (red indicates points of TSC involvement)
1.1	1.1.A. Kickoff meeting with TOM.	Due 1 week after being issued this Task Order.	1
1.1	1.1.B. Brief, written progress reports.	Due monthly or upon request by the TOM for the duration of this Task Order.	NA
1.1	1.1.C. Project meetings and other communications as needed.	Due upon request by the TOM for the duration of this Task Order.	NA
1.2	1.2.A. Draft QAPP submitted to the TOM/QAM for review.	Due 3 weeks after being issued the Task Order.	3
1.2	1.2.B. Revised QAPP addressing comments on the draft.	Due 1 week after receiving comments.	4
2.1	2.1.A. Assist TOM in assembling the TSC.	Due 4 weeks after completion of Deliverable 1.1.A.	5
2.1	2.1.B. Schedule and host a 1.5 hour kickoff webinar with the TSC.	Due 2 weeks after approval of Deliverable 2.1.A.	7
2.2	2.2.A. Host 3-4 webinar briefings of 1 hour each.	At intervals determined in consultation with the TOM.	NA
2.2	2.1.B. Develop presentations and other materials for each webinar.	At intervals determined in consultation with the TOM.	NA
3.1	3.1.A. Bibliography in support of identifying potential wetlands attributes for framework.	Due 8 weeks after completion of Deliverable 1.1.A.	9
3.1	3.1.B. Memo describing feasibility analysis of options for developing a framework.	Due 4 weeks after approval of Deliverable 3.1.A.	13
3.2	3.2.A. Memo proposing criteria for selecting an approach to a framework.	Due 2 weeks after approval of Deliverable 3.1.B.	15

3.2	3.2.B. TSC webinar, and memo revising deliverable 3.2.A, documenting selection of an approach, and developing steps for drafting the framework.	Due 4 weeks after approval of Deliverable 3.2.A.	19
4.1	4.1.A. Draft framework with examples of inventory entries.	Due 4 weeks after approval of Deliverable 3.2.B.	23
4.1	4.1.B. TSC webinar, and revised draft framework and examples of inventory entries.	Due 4 weeks after approval of Deliverable 4.1.A.	27
4.2	4.2.A. Draft inventory of relative vulnerabilities of wetlands.	Due 8 weeks after approval of Deliverable 4.1.B.	35
4.2	4.2.B. Revised draft inventory of relative vulnerabilities of wetlands.	Due 3 weeks after approval of Deliverable 4.2.A.	38
4.2	4.2.C. Draft Memo explaining the framework and summarizing the inventory findings (for workshop).	Due 2 weeks after approval of Deliverable 4.2.B.	40
4.2	4.2.D. Final Memo explaining the framework and summarizing the inventory findings (for workshop).	Due 2 weeks after receiving comments from TOM on Deliverable 4.2.C.	42
5.1	Pre-workshop support.	Due 8 weeks after approval of Deliverable 4.2.D.	50
5.2	Onsite workshop support.	Due 2 weeks after approval of Deliverable 5.1.	52
6.1	Post-workshop conceptual framework and inventory (revision of 4.2.B).	Due 4 weeks after completion of Deliverable 5.2.	56
6.2	TSC webinar, and final conceptual framework and inventory.	Due 6 weeks after receiving comments on Deliverable 6.1.	62
7.1	7.1.A. Draft outline for analysis and summary of best approaches for development of guidance.	Due 2 weeks after approval of Deliverable 6.2.	64
7.1	7.1. B. Revised and annotated outline for analysis and summary of best approaches for development of guidance.	Due 3 weeks after approval of Deliverable 7.1.A.	67
7.2	7.2.A. Draft analysis and summary of best approaches for development of guidance.	Due 10 weeks after approval of Deliverable 7.1.B.	77

7.2	7.2.B. TSC webinar, and final analysis and summary of best approaches for development of guidance.	Due 8 weeks after receiving comments on Deliverable 7.1.C.	85
8.1	8.1.A. Proposed outline for a manuscript (journal article).	Due 2 weeks after approval of Deliverable 7.2.B.	87
8.1	8.1. B. Annotated outline for a manuscript (journal article).	Due 2 weeks after approval of Deliverable 8.1.A.	89
8.2	8.2.A. First draft full manuscript (journal article).	Due 12 weeks after approval of Deliverable 8.1.B.	101
8.2	8.2.B. Final draft manuscript (journal article) addressing comments conveyed by the TOM.	Due 4 weeks after receiving TOM's comments on Deliverable 8.2.A.	105

K. REPORTING

All documentation and reporting under this Task Order shall be in compliance with contract requirements. See contract clause F.2, F.3, and J.2 "List of Attachments, Number 2 - Reports of Work".

Additional requirements specific to this Task Order are as follows:

Electronic deliverables must be in an original file format that can be supported by EPA after the end of the Period of Performance of the Task Order. The standard office software at EPA is MS Office.

L. TRAVEL

Workshop travel will be required under this TO. All travel under this Task Order shall be in compliance with contract requirements. See contract clause H.24.

M. CONTRACTOR IDENTIFICATION

Contractor personnel shall always identify themselves as Contractor employees by name and organization and physically display that information through an identification badge. Contractor personnel are prohibited from acting as the Agency's official representative.

The Contractor shall refer any questions relating to the interpretation of EPA policy, guidance, or regulation to the Task Order Manager.

N. REFERENCES

CCSP, 2008. Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands. A Report by the U.S. Climate Change

Science Program and the Subcommittee on Global Change Research. [Thomas R. Karl, Gerald A. Meehl, Christopher D. Miller, Susan J. Hassol, Anne M. Waple, and William L. Murray (eds.)]. Department of Commerce, NOAA's National Climatic Data Center, Washington, D.C., USA, 164 pp.

CCSP, 2009: Coastal Sensitivity to Sea-Level Rise: A Focus on the Mid-Atlantic Region. A report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. [James G. Titus (Coordinating Lead Author), K. Eric Anderson, Donald R. Cahoon, Dean B. Gesch, Stephen K. Gill, Benjamin T. Gutierrez, E. Robert Thieler, and S. Jeffress Williams (Lead Authors)]. U.S. Environmental Protection Agency, Washington D.C., USA, 320 pp.

IPCC, 2007. Climate Change 2007: Synthesis Report - Summary for Policymakers. Available online at: http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

Appendix A

NCEA - Elements of a Quality Assurance Project Plan (QAPP) for Secondary Data

1. Title and Approval Page

Include signatures lines for the contractor, his/her quality system personnel, the NCEA project officer, and his/her quality assurance coordinator.

2. Quality System Components

Describe the contractor's current organizational quality assurance program, including but not limited to:

- a. Who has responsibility for the quality control of projects?
- b. Where is this person in the organizational hierarchy?
- c. What quality control and assurance procedures are planned or in place for projects like the proposed, and are these procedures documented?
- d. How does the person responsible for quality assess and document the quality control exercised in projects and implement any necessary corrective actions, including those that require approval from the project's client?

3. Project Definition and Background

This information may be found in the Statement of work or narrative for the contract.

4. Data Quality Objectives (DQOs)

Include an explanation of data use and acceptance criteria (precision, accuracy, representativeness, completeness, and compatibility). Some of DQOs may be specified in the Statement of Work or narrative for the project.

5. Project Organization and Responsibilities of the Researcher

Briefly describe how the project will be executed and who has responsibility for the various tasks. List licenses, certifications, and accreditations that are applicable to this project. Document how any items and services procured under this project will be determined to be of good quality and applicable to the needs of this project.

6. Project Description, Documentation, and Reporting

A. Literature Search

B. Extracting, Proofing, Presenting Data from Literature Searches

General Considerations and QA Requirements for the following issues:

- a. Source(s) of the existing (secondary) data/information and rationale for selecting the source(s); Sample selection, collection and preparation (*describe the planning process for data gathering operations and how the organization ensures that data or information collected for a project are of sufficient quality to satisfy the needs of the project*);

- b. Non-quality constraints on the existing (secondary) data/information (e.g., legal, programmatic, CBI) that affect its use in the project;
- c. How the data/information will be used in the project, e.g., augment or replace existing data/information, verify or validate existing data/information;
- d. Procedures for determining the quality of the existing (secondary) data/information, i.e., how and to what degree will the accuracy, precision, representativeness, completeness, and comparability of the data/information be determined for the purposes of the project; what are the limitations or uncertainties associated with the data/information;
- e. Reduction/validation procedures, including calculations and equations, for the existing (secondary) data/information that are specific to the project; *(for secondary data gathered from publication, see the accompanying "Quality Assurance Instructions for Researchers Citing Secondary Information")*; and
- f. Plans for review of the project during operation (oversight).
(discuss how the contractor will test for quality problems with this project. Who is normally responsible for this process of testing? Who changes the methods within the project if change is indicated by these tests?).

7. Reconciliation with Data Quality Objectives

Describe how issues which come up during the project and require adjustment to the DQOs will be resolved.

Quality Assurance Instructions for Researchers Citing Secondary Information

Section 515 of the Treasury and General Government Appropriations Act for fiscal year 2001 directed the Office of Management and Budget (OMB) to issue guidelines to all Federal agencies to ensure and maximize the quality, objectivity, utility and integrity of the information they disseminate. This law and the OMB guidance subsequently issued in **67 FR 8452**, 2/22/02, underscore the need for EPA/NCEA to assess the quality and credibility of the secondary research information cited in its criteria and assessment documents.

Secondary research information is defined as information that was originally produced for one purpose but is now being recompiled or reassessed for a different purpose. Secondary research information usually originates from such primary sources as journal articles, books, government and industry reports, databases and models. The set of processes that follows serves as a guide to evaluate the strength of secondary information gathered from these primary sources.

To begin, researchers must list the sources for the references they use. The source list will include but not be limited to the names of any commercially available or local databases of literature that the researcher searches by computer or by hand along with the search terms, search strategies, and time periods used in these searches. The list also will include any print sources such as books or journal articles which provided references from their respective

bibliographies and databases or models of observational information related to the physical environment, effects on the ecosystem, or effects linked to human health.

After fully reporting all of the reference sources, identify the most relevant information or key studies among the references you cite and critically evaluate these studies. Key studies are those most crucial or pivotal to answer the research questions posed in the project. Though the key study may show only negative results or may even be all that is currently available on the research topic, it is crucial, nonetheless, to any discussion of the topic. (In the case of databases or models or observational information, either may constitute a key study.) Sometimes, the key study is not recognizable until all of the information is gathered and sifted through. Key studies should exhibit at least most of the general attributes defined below, which bear comparison to the OMB guidelines to federal agencies mentioned above.

FOCUS:	the work not only addressed the area of inquiry under consideration but also contributes to its understanding;
VERITY:	the work is consistent with accepted knowledge in the field or, if not, the new or varying information is documented within the work; the work fits within the context of the literature and is intellectually honest and authentic;
INTEGRITY:	the work is structurally sound and hangs together; the design or research rationale is logical and appropriate;
RIGOR:	the work is important, meaningful, and non-trivial relative to the field and exhibits sufficient depth of intellect rather than superficial or simplistic reasoning;
UTILITY:	the work is useful and professionally relevant; it makes a contribution to the field in terms of the practitioners' understanding or decision-making on the topic; and
CLARITY:	the writing is clear and the writing style is appropriate to the nature of the study.

Use the following checklist to critically evaluate the key studies:

QUALITY EVALUATION FOR KEY STUDIES

1. Study identifiers:

Author(s):

Title:

Citation:

Storage location (e.g., library, facility archive, personal archive);

2. Why is this a key study compared to other studies reviewed for this particular project (Check all boxes as applicable or add why if not listed)?

- ☐ study is an example of new research
- ☐ study confirms previous key study
- ☐ study replaces weaker previous key study
- ☐ best or only available study
- ☐ other _____

3. The different aspects of a study listed below are important to consider in an evaluation of the quality of a key study. In your evaluation of the quality of a key study identified above, check the box that best describes the degree to which the key study addresses these aspects, i.e., as Acceptable (Accept.), Marginal (Marg.), or Unacceptable (Unaccept.); if the aspect is not applicable to the study, check (N/A); or if there is insufficient information available in the study report to evaluate the aspect, check Indeterminate (Indeter.).

Accept.	Marg.	Unaccept.	N/A	Indeter.	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Clearly stated hypotheses with null and alternate indicated
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Overall design of the study
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Appropriateness of statistical methods used and reporting of results
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Specification of the units of analysis
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Identification and explanation of missing data
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Consistently reported quantities among abstract, text, tables and graphs
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Data reported in the study sufficiently detailed and complete to make the assessment required (e.g., human health effects; results from animal testing; ecological impact; occurrence, persistence, and interaction in the atmosphere or other media)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Adequacy of discussion of results, alternative hypotheses, and confounding factors
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Study conducted at a credible facility, published in a credible peer-reviewed source, subjected to internal peer-review if not published.

☐ ☐ ☐ ☐ ☐ **Other:**

Please include a brief comment on less than acceptable ratings; attach additional pages(s) as needed:

If the study uses any data from sources outside of the study, what does the study offer in terms of an assessment of the quality of these data? State any professional opinions one may have about the data in question.

ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES

1 21

IMPORTANT: Mark all packages and papers with contract and/or order numbers.

1. DATE OF ORDER 10/15/2012		2. CONTRACT NO. (If any) EP-C-11-037		6. SHIP TO: a. NAME OF CONSIGNEE ORD NCEA PY2	
3. ORDER NO. 0004		4. REQUISITION/REFERENCE NO. PR-ORD-12-02147			
5. ISSUING OFFICE (Address correspondence to) CPOD US Environmental Protection Agency 26 West Martin Luther King Drive Mail Code: NWD Cincinnati OH 45268				b. STREET ADDRESS US Environmental Protection Agency ORD NCEA 2733 S. Crystal Drive Two Potomac Yard (North Building)	
				c. CITY Arlington	d. STATE VA
				e. ZIP CODE 22202	
7. TO: (b)(4)				f. SHIP VIA	
a. NAME OF CONTRACTOR TETRA TECH EM, INC.				8. TYPE OF ORDER	
b. COMPANY NAME				<input type="checkbox"/> a. PURCHASE <input checked="" type="checkbox"/> b. DELIVERY REFERENCE YOUR: _____ Please furnish the following on the terms and conditions specified on both sides of this order and on the attached sheet, if any, including delivery as indicated.	
c. STREET ADDRESS 1881 CAMPUS COMMONS DRIVE SUITE 200 (b)(4)				Except for billing instructions on the reverse, this delivery order is subject to instructions contained on this side only of this form and is issued subject to the terms and conditions of the above-numbered contract.	
d. CITY RESTON		e. STATE VA	f. ZIP CODE 201911519		
9. ACCOUNTING AND APPROPRIATION DATA See Schedule				10. REQUISITIONING OFFICE CPOD	

11. BUSINESS CLASSIFICATION (Check appropriate box(es)) <input type="checkbox"/> a. SMALL <input checked="" type="checkbox"/> b. OTHER THAN SMALL <input type="checkbox"/> c. DISADVANTAGED <input type="checkbox"/> d. WOMEN-OWNED <input type="checkbox"/> e. HUBZone <input type="checkbox"/> f. SERVICE-DISABLED VETERAN-OWNED <input type="checkbox"/> g. WOMEN-OWNED SMALL BUSINESS (WOSB) ELIGIBLE UNDER THE WOSB PROGRAM <input type="checkbox"/> h. EDWOSB				12. F.O.B. POINT Destination	
13. PLACE OF a. INSPECTION Destination		b. ACCEPTANCE Destination		14. GOVERNMENT B/L NO.	
				15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date)	
				16. DISCOUNT TERMS	

17. SCHEDULE (See reverse for Rejections)

ITEM NO. (a)	SUPPLIES OR SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	DUNS Number: (b)(4) Framework and Inventory of Relative Wetland Vulnerabilities to Inform EPA Office of Water Programs TOPO: Jordan West Continued ...					

SEE BILLING INSTRUCTIONS ON REVERSE	18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.		17(h) TOTAL (Cont. pages)
	21. MAIL INVOICE TO:						
	a. NAME RTP Finance Center						\$159,974.83
	b. STREET ADDRESS (or P.O. Box) US Environmental Protection Agency RTP-Finance Center (D143-02) 109 TW Alexander Drive						
c. CITY Durham		d. STATE NC	e. ZIP CODE 27711				17(i) GRAND TOTAL

22. UNITED STATES OF AMERICA BY (Signature)

23. NAME (Typed)
Camille W. Davis
TITLE: CONTRACTING/ORDERING OFFICER

ORDER FOR SUPPLIES OR SERVICES
SCHEDULE - CONTINUATION

PAGE NO
2

IMPORTANT: Mark all packages and papers with contract and/or order numbers.

DATE OF ORDER 10/15/2012	CONTRACT NO. EP-C-11-037	ORDER NO. 0004
-----------------------------	-----------------------------	-------------------

ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
00011	<p>Admin Office: CPOD US Environmental Protection Agency 26 West Martin Luther King Drive Mail Code: NWD Cincinnati OH 45268</p> <p>Accounting Info: 12-13-C-262H000-101FK6XR1-2532-12262HC053-00 1 BFY: 12 EFY: 13 Fund: C Budget Org: 262H000 Program (PRC): 101FK6XR1 Budget (BOC): 2532 DCN - Line ID: 12262HC053-001 Period of Performance: 09/14/2011 to 08/31/2016</p> <p>STREAMS2: Framework and inventory of relative wetland vulnerabilities to inform EPA Office of Water programs</p> <p>Framework and Inventory of Relative Wetland Vulnerabilities to Inform EPA Office of Water Programs Award Type: Cost-plus-fixed-fee Total Estimated Cost: (b)(4) Fixed Fee: (b)(4) Completion Form</p> <p>Period of Performance: 10/15/2012 to 10/15/2013</p> <p>STEAMS2: Framework and inventory of relative wetland vulnerabilities to inform EPA Office of Water programs COR/WAM: JORDAN WEST ALTERNATIVE: COR/WAM: SUSAN JULIUS</p> <p>The obligated amount of award: \$159,974.83. The total for this award is</p>				159,974.83	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$159,974.83

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE		PAGE OF PAGES	
				1		2	
2. AMENDMENT/MODIFICATION NO.		3. EFFECTIVE DATE		4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO. (If applicable)	
001		01/03/2013		PR-ORD-12-02147			
6. ISSUED BY		CODE		7. ADMINISTERED BY (If other than Item 6)		CODE	
CPOD		CPOD		CPOD		CPOD	
CPOD US Environmental Protection Agency 26 West Martin Luther King Drive Mail Code: NWD Cincinnati OH 45268				CPOD US Environmental Protection Agency 26 West Martin Luther King Drive Mail Code: NWD Cincinnati OH 45268			
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)				(x) 9A. AMENDMENT OF SOLICITATION NO.			
TETRA TECH EM, INC. Attn: (b)(4) 1881 CAMPUS COMMONS DRIVE SUITE 200 (b)(4) RESTON VA 201911519				9B. DATED (SEE ITEM 11)			
				x 10A. MODIFICATION OF CONTRACT/ORDER NO. EP-C-11-037 0004			
				10B. DATED (SEE ITEM 13) 10/15/2012			
CODE		(b)(4)		FACILITY CODE			
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS							
<input type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended, <input type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNTING AND APPROPRIATION DATA (If required) See Schedule							
13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.							
CHECK ONE		A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.					
X		B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).					
		C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:					
		D. OTHER (Specify type of modification and authority)					
E. IMPORTANT: Contractor <input checked="" type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.							
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)							
DUNS Number: (b)(4)							
Framework and Inventory of Relative Wetland Vulnerabilities to Inform EPA Office of Water Programs							
TOPO: Jordan West							
LIST OF CHANGES:							
Reason for Modification : Other Administrative Action							
CHANGES FOR LINE ITEM NUMBER: 11							
End Date changed from 15-OCT-13 to 31-DEC-15							
Continued ...							
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.							
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)			
				Camille W. Davis			
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA		16C. DATE SIGNED	
(Signature of person authorized to sign)				(Signature of Contracting Officer)			

CONTINUATION SHEET

REFERENCE NO. OF DOCUMENT BEING CONTINUED

EP-C-11-037/0004/001

PAGE

OF

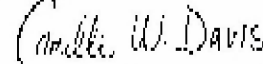
2

2

NAME OF OFFEROR OR CONTRACTOR

TETRA TECH EM, INC.

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>The purpose of this modification is to correct the end date for the period of performance as originally indicated in the task order solicitation, PR-ORD-12-02147.</p> <p>This modification also corrects the Period of Performance dates stated on Pages 2 and 3 of the task order</p> <p>From: 10/15/2012 to 10/15/2013 To: 10/15/2012 to 12/31/2015</p> <p>and</p> <p>From: October 15, 2012 through October 15, 2013 To: October 15, 2012 through December 31, 2015</p> <p>This is a No Cost modification and is just to clarify/correct the end date of the task order period of performance. Delivery Location Code: ORD NCEA PY2 ORD NCEA PY2 US Environmental Protection Agency ORD NCEA 2733 S. Crystal Drive Two Potomac Yard (North Building) Arlington VA 22202 USA</p> <p>Payment: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (D143-02) 109 TW Alexander Drive Durham NC 27711</p> <p>FOB: Destination Period of Performance: 09/14/2011 to 08/31/2016</p>				

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE		PAGE OF PAGES	
						1 13	
2. AMENDMENT/MODIFICATION NO.		3. EFFECTIVE DATE		4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO. (If applicable)	
002		03/21/2014		See Schedule			
6. ISSUED BY		CODE		7. ADMINISTERED BY (If other than Item 6)		CODE	
CPOD							
US Environmental Protection Agency 26 West Martin Luther King Drive Mail Code: NWD Cincinnati OH 45268							
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)				(x) 9A. AMENDMENT OF SOLICITATION NO.			
TETRA TECH EM, INC.							
Attn: (b)(4)				9B. DATED (SEE ITEM 11)			
1881 CAMPUS COMMONS DRIVE							
SUITE 200							
(b)(4)				x 10A. MODIFICATION OF CONTRACT/ORDER NO.			
				EP-C-11-037			
				0004			
				10B. DATED (SEE ITEM 13)			
CODE (b)(4)				10/15/2012			
FACILITY CODE							
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS							
<input type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended. <input type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNTING AND APPROPRIATION DATA (If required)				Net Increase:		\$120,000.00	
See Schedule							
13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.							
CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.						
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).						
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:						
X	D. OTHER (Specify type of modification and authority) FAR 52.243-2, Change--Cost-Reimbursement and Tetra Tech's proposal dated February 19, 2014						
E. IMPORTANT: Contractor <input checked="" type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.							
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)							
DUNS Number: (b)(4)							
The purposes of this modification are to: incorporate PWS revisions; revise the cost/fee ceiling; and add incremental funding for these changes.							
TOPO: Jordan West							
LIST OF CHANGES:							
Reason for Modification: PWS Revisions and Revise Cost/Fee ceilings							
Total Amount for this Modification: \$125,295.25							
New Total Amount for this Task Order: \$285,270.08							
Continued ...							
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.							
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)			
				Camille W. Davis			
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED		16C. DATE SIGNED			
(Signature of person authorized to sign)				 ELECTRONIC SIGNATURE		03/21/2014	
NSN 7540-01-152-8070 Previous edition unusable				STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243			

CONTINUATION SHEET

REFERENCE NO. OF DOCUMENT BEING CONTINUED

EP-C-11-037/0004/002

PAGE OF

2

13

NAME OF OFFEROR OR CONTRACTOR

TETRA TECH EM, INC.

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>Obligated Amount for this Modification: \$120,000.00</p> <p>New Total Obligated Amount for this Award: \$279,974.83</p> <p>Incremental Funded Amount changed</p> <p>From: \$159,974.83 To: \$279,974.83</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 13-14-C-262H000-202FK7-2532-26A5C-13262HC119-001 Beginning FiscalYear 13 Ending Fiscal Year 14 Fund (Appropriation) C Budget Organization 262H000 Program (PRC) 202FK7 Budget (BOC) 2532 Job # (Site/Project) Cost Organization 26A5C DCN-LineID 13262HC119-001 Quantity: 0 Amount: \$59,172.00</p> <p>Cost: (b)(4) Fee: Total: \$59,172.00</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 13-14-C-262H000-101FK6XR1-2532-26A5C-13262HC119-002 2 Beginning FiscalYear 13 Ending Fiscal Year 14 Fund (Appropriation) C Budget Organization 262H000 Program (PRC) 101FK6XR1 Budget (BOC) 2532 Job # (Site/Project) Cost Organization 26A5C DCN-LineID 13262HC119-002 Quantity: 0 Amount: \$60,828.00</p> <p>Cost: (b)(4) Fee: Total: \$60,828.00 Continued ...</p>				

CONTINUATION SHEET

REFERENCE NO. OF DOCUMENT BEING CONTINUED

EP-C-11-037/0004/002

PAGE 3 OF 13

NAME OF OFFEROR OR CONTRACTOR

TETRA TECH EM, INC.

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>The revised Incremental funding for this Task Order is:</p> <p>Cost: (b)(4)</p> <p>Fee:</p> <p>Total: \$279,974.83</p> <p>The revised Total Cost and Fee ceilings for this Task Order are as follows:</p> <p>Cost: (b)(4)</p> <p>Fee:</p> <p>Total: \$285,270.08</p> <p>Payment:</p> <p>RTP Finance Center US Environmental Protection Agency RTP-Finance Center (D143-02) 109 TW Alexander Drive Durham NC 27711</p> <p>FOB: Destination</p> <p>Period of Performance: 10/15/2013 to 12/31/2015</p>				

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE		PAGE OF PAGES 1 2	
2. AMENDMENT/MODIFICATION NO. 003		3. EFFECTIVE DATE 05/01/2014		4. REQUISITION/PURCHASE REQ. NO. PR-ORD-14-01313		5. PROJECT NO. (If applicable)	
6. ISSUED BY CPOD US Environmental Protection Agency 26 West Martin Luther King Drive Mail Code: NWD Cincinnati OH 45268		CODE		7. ADMINISTERED BY (If other than Item 6)		CODE	
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) TETRA TECH EM, INC. Attn: (b)(4) 1881 CAMPUS COMMONS DRIVE SUITE 200 (b)(4) RESTON VA 201911519				(x)		9A. AMENDMENT OF SOLICITATION NO.	
						9B. DATED (SEE ITEM 11)	
				x		10A. MODIFICATION OF CONTRACT/ORDER NO. EP-C-11-037 0004	
						10B. DATED (SEE ITEM 13) 10/15/2012	
CODE		(b)(4)		FACILITY CODE			

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required) Net Increase: \$5,295.24
See Schedule

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	D. OTHER (Specify type of modification and authority) Limitation of Funds Notice

E. IMPORTANT: Contractor ☒ is not, ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

DUNS Number: (b)(4)

The purpose of this modification is to add incremental funding.

TOPO: Jordan West

LIST OF CHANGES:

Reason for Modification : Funding Only Action

Obligated Amount for this Modification: \$5,295.24

Continued ...

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Camille W. Davis	
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16C. DATE SIGNED 05/01/2014	16B. SIGNATURE Camille W. Davis

CONTINUATION SHEET

REFERENCE NO. OF DOCUMENT BEING CONTINUED

EP-C-11-037/0004/003

PAGE

OF

2

2

NAME OF OFFEROR OR CONTRACTOR

TETRA TECH EM, INC.

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>Incremental Funded Amount changed From: \$279,974.83 To: \$285,270.07</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 13-14-C-262H000-101FK6XR1-2532-26A5C-14262HC009-001 Beginning FiscalYear 13 Ending Fiscal Year 14 Fund (Appropriation) C Budget Organization 262H000 Program (PRC) 101FK6XR1 Budget (BOC) 2532 Job # (Site/Project) Cost Organization 26A5C DCN-LineID 14262HC009-001 Quantity: 0 Amount: \$5,295.24</p> <p>Cost: (b)(4) Fee: Total: \$5,295.24</p> <p>The Total Incremental Funding amount is hereby changed to:</p> <p>Cost: (b)(4) Fee: Total: \$285,270.07</p> <p>Delivery Location Code: ORD NCEA PY2 ORD NCEA PY2 US Environmental Protection Agency ORD NCEA 2733 S. Crystal Drive Two Potomac Yard (North Building) Arlington VA 22202 USA</p> <p>Payment: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (D143-02) 109 TW Alexander Drive Durham NC 27711</p> <p>FOB: Destination Period of Performance: 10/15/2013 to 12/31/2015</p>				